

(i) $\{f_n\}$ is a sequence of functions in \mathcal{F} such that $f_n \rightarrow f$ in \mathcal{F} and $f_n \rightarrow f$ in \mathcal{F} uniformly on compact sets.

Figure 2B

AACCGCCTTGCCGCGCCGGAAGTGGCGGCGGATTCGACGATGACGGTCGTTGACCAAAGAGCCGGGGACGAT 1920
 N R L A G R E L P V D G G F D D D G R L T K E P G T I
 CGAGAAAAATCGCCGCATTTTACCCATGGGCTACTGGAAGGTTCCGGCCTGTCGATCGTGCTGGATATGATTGCCACCC 2000
 E K N R R I L P M G Y W K G S G L S I V L D M I A T L
 TCCTCTCCAACGGATCGTCGGTTGCCGAAGTGACCCAGGAAAAACAGCGATGAATATGGCGTTTCGCAGATCTTCATCGCT 2080
 L S N G S S V A E V T Q E N S D E Y G V S Q I F I A
 ATTGAAGTGGATAAGCTGATCGACGGCGCAACCCGCGACGCCAAGCTGCAACGGATTATGGATTTTCATCACCACCGCCGA 2160
 I E V D K L I D G A T R D A K L Q R I M D F I T T A E
 GCGCGCCGATGAAAATGTGGCGGTCCGTCTTCTGGCCATGAATTTACCCGTCTGCTGGATGAAAACCGCCGCAACGGCA 2240
 R A D E N V A V R L P G H E F T R L L D E N R R N G I
 TTACCGTCGATGACAGCGTATGGGCCAAAATTCAGGCGCTGTAAGGAGCTACCCATGACAGCGTATGGGCCAAAATTC 2320
 T V D D S V W A K I Q A L *
 → *yiaL*
 GGCGCTGTAAGGAGCTCACCCATGATTTTGGTTCATATTGCTCAACCTAATCCGTGTCGTCGCCCCGCGCCATTGAGCG 2400
 M I F G H I A Q P N P C R L P A A I E R
 GGCGCTTGATTTTCTGCGCACGACGGATTTCACGCGCTGGCACCCGGCGCTGGAATTCGACGGCCAAAACATCTTCG 2480
 A L D F L R T T D F H A L A P G V V E I D G Q N I F A
 CGCAGGTTATCGACTTAACCACTCGCGATGCCGCTGAAAATCGTCCGGAGGTCCACCGTCGCTATCTGGATATCCAGTTT 2560
 Q V I D L T T R D A A E N R P E V H R R Y L D I Q F
 CTGGCATCGGGCGAAGAAAAATCGGTATCGCCATTGATACCGCAATAATCAAATCAGCGAATCTTTATTAGAACAGCG 2640
 L A S G E E K I G I A I D T G N N Q I S E S L L E Q R
 CGATATTATTTTTTATCACGACAGCGAATGAATCGTTCTTTGAAATGACGCCAGGCAACTATGCGATATTTTTCCCGC 2720
 D I I F Y H D S E H E S F F E M T P G N Y A I F F P Q
 AAGATGTTTCATCGTCCTGGATGTAATAAACTGTAGCCACGCCGATCCGCAAAATAGTCGTTAAAGTCGCTATTTTCAGTT 2800
 D V H R P G C N K T V A T P I R K I V V K V A I S V
 → *orf1*
 TTATAAGAAGGAGCACAAAATGAATTGGAATAATACCGGTTACATTATCGGTGCGTACCCCTGTGCCCCCTGTGCACCCT 2880
 L * M N S N N T G Y I I G A Y P C A P C A P S
 CATTTACCAAAAAGAGTGAAGAGGAAGAGATGGAATTCTGGCGGCAGCTCTCCGACACCCCGGATATTCGCGGGCTGGAG 2960
 F H Q K S E E E E M E F W R Q L S D T P D I R G L E
 CAACCTGCCTACCCTGCCTTGAACATCTTCATCCGCTCGGCGACGAGTGGTTATTGCGCCATACCCCGGGACACTGGCA 3040
 Q P C L P C L E H L H P L G D E W L L R H T P G H W Q
 GATTGTCGTTACCGCCATCATGGAAACCATGCGCGCCGCGGTGAAAACGGCGGCTTTGGGCTGGCGTCCAGCGACGAAA 3120
 I V V T A I M E T M R R R G E N G G F G L A S S D E T
 CGCAGCGCAAAGCCTGCGTGGAGTACTATCGCCACCTGCAGCAGAAGATCGCTAAAATCAATGGCAATACCGCCGGAAG 3200
 Q R K A C V E Y Y R H L Q Q K I A K I N G N T A G K
 GTCATTGCCCTTGAGCTTCACGCCGCCCCGCTGGCGGGCAATGCCAACGTGGCTCAGGCTACCGACGCCTTTGCCCGTTC 3280
 V I A L E L H A A P L A G N A N V A Q A T D A F A R S
 ATTAAGAAATATACCCGCTGGGACTGGTCTGCGAGCTGGTGGTGGAGCACTGCGACGCGATGACCGGCAGCGCGCCGC 3360
 L K E I T R W D W S C E L V L E H C D A M T G S A P R
 GCAAAGGATTTTGGCGTTAGAAAACGTGCTGGAAGCCATTGCCGATTATGACGTTGCAATTTGTATTAACTGGGCGCGT 3440
 K G F L P L E N V L E A I A D Y D V G I C I N W A R

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Figure 2C

TCGGCCATTGAAGGGCGGAATACCGTGCTACCGCTCACCACATACGCAGCAGGTAAACGGGCAGGAAAGCTCGGCGCGCT 3520
S A I E G R N T V L P L T H T Q Q V K R A G K L G A L

GATgTTTTCTGGCAGCAGCAGACCGGCGAGTACGGCGAATGGCAGGATTTACACGCGCCGTTTCGCGCCTTTCTGCCCCG 3600
M F S G T T Q T G E Y G E W Q D L H A P F A P F C P Q

AgAGCCTGATGACCACCGAACACGCTCGTGAATTATTTGCCTGCGCAGGAACCGCCCCCTGCAATTTTCAGGCATTAAA 3680
S L M T T E H A R E L F A C A G T A P L Q F S G I K

TTACTGGAAATTAATGCCAGCGCAAACGTTGATCATCGCATCGCGATATTACGCGACGGCATCTCCGCGCTAAAACAAGC 3760
L L E I N A S A N V D H R I A I L R D G I S A L K Q A

ACAATAATAATAATCACCTTCATCACCAGAATATTTTTTAATATTACGAGACTATAAAGATgAATATAACCTCTAACTCTA 3840
Q * M N I T S N S T

CAACCAAAGATATACCGCGCCAGCGCTGGTTAAGAATCATTCCGCTTACTGATCACTTGTATTATTCTTATATGGAC 3920
T K D I P R Q R W L R I I P P I L I T C I I S Y M D

CGGGTCAATATTGCCTTTGCGATGCCCCGAGGTATGGATGCCGACTTAGGTATTTCCGCCACCATGGCGGGGCTGGCGGG 4000
R V N I A F A M P G G M D A D L G I S A T M A G L A G

CGGTATTTTCTTTATCGGTTATCTATTTTTTACAGGTTCCCGCGGGGAAATTGCCGTTACGGTAGCGGTAAGAAATTTA 4080
G I F F I G Y L F L Q V P G G K I A V H G S G K K F I

TCGGCTGGTCGCTGGTCGCCTGGGCGGTCATCTCCGTGCTGACGGGGTTAATTACCAATCAGTACCAGCTGCTGGCCCTG 4160
G W S L V A W A V I S V L T G L I T N Q Y Q L L A L

CGCTTCTTACTGGGCGTGGCGGAAGGCGGTATGCTGCCGGTCTTCTCAGCATGATCAGTAACTGGTTCCCCGACGCTGA 4240
R F L L G V A E G G M L P V V L T M I S N W F P D A E

ACGCGGTGCGGCCAACGCGATTGTCAATTATGTTTGTGCCGATTGCCGGGATTATCACCGCCCACTCTCAGGCTGGATTA 4320
R G R A N A I V I M F V P I A G I I T A P L S G W I I

TCACGGTTCTCGACTGGCGCTGGCTGTTTATTATCGAAGGTTGCTCTCGCTGGTTGTTCTGGTTCTGTGGGCATACACC 4400
T V L D W R W L F I I E G L L S L V V L V L W A Y T

ATCTATGACCGTCCGCAGGAAGCGCGCTGGATTTCGAAGCAGAGAAGCGCTATCTGGTCGAGACGCTGGCCGCGGAGCA 4480
I Y D R P Q E A R W I S E A E K R Y L V E T L A A E Q

AAAAGCCATTGCCGGCACCGAGGTGAAAACGCCTCTCTGAGCGCCGTTCTCTCCGACAAAACCATGTGGCAGCTTATCG 4560
K A I A G T E V K N A S L S A V L S D K T M W Q L I A

CCCTGAACCTTCTCTACCAgACCGGCATTTACGGCTACaCCCTGTGGCTACCCACCATTTGAAAGAATTGACCCATAGC 4640
L N F F Y Q T G I Y G Y T L W L P T I L K E L T H S

AGCATGGGGCAGGTGCGCATGCTTGCCATTCTGCCGTACGTGCGGCCATTGCTGGGATGTTCTCTGTTTCTCCCTTTTC 4720
S M G Q V G M L A I L P Y V G A I A G M F L F S S L S

AGACCGAACCGGTAAACGCAAGCTGTTGCTCTGCCTGCCGCTgATTGGCTTCGCTCTGTGCATGTTCTGTGCGGTGGCGC 4800
D R T G K R K L F V C L P L I G F A L C M F L S V A L

TgAAAAACCAAATTTGGCTCTCCTATGCCGCGCTGGTCGGCTGCGGATTCTTCTGCAATCGGCGGCTGGCGGTGTTCTGG 4880
K N Q I W L S Y A A L V G C G F F L Q S A A G V F W

ACCATCCCGGCACGCTCTGTTTCAGCGCGGAAATGGCGGGCGGCGCGCGGGTTATCAACGCGCTTGGCAACCTCGGCGG 4960
T I P A R L F S A E M A G G A R G V I N A L G N L G G

ATTTGTGGCCCTTATGCGGTGCGGGTGCTGATCACGTTgTACAGCAAAGACGCTgGCGTCTATTGCCTGGCGATCTCCC 5040
F C G P Y A V G V L I T L Y S K D A G V Y C L A I S L

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Figure 2D

TGGCGCTGGCCGCGCTGATgGCGCTgCTGCTGCCGGCGAAATGCGATGCCgGTGCTGCGCCGGTaAagACgATAAaTCCA 5120
 A L A A L M A L L L P A K C D A G A A P V K T I N P
 CATAAACGCACTGCGTAAACTCGAGCCCGGGCGCTgCGCCTGCCGGGCTGCGAAATATGCCGGGTTACCCCGGTaAC 5200
 H K R T A *
 → *lyxK*
 AATgAGATGCgAAAaATGAGCAAgAAACAgGCCTTCTGGCTGGGTATTGATTGCGGCGGCACCTATCTGAAAGCCGGTTT 5280
 M S K K Q A F W L G I D C G G T Y L K A G L
 ATATGACGCCGAAGGTCAATGAACATGGCATTGTGCGGCAAGCGCTACGGACGATGTGCCCCCTGCCGGGTACGCCGAAC 5360
 Y D A E G H E H G I V R Q A L R T M S P L P G Y A E R
 GCGACATGCCCAGCTCTGGCAACACTGCGCGGCGACCATTGCCGGGCTATTACAGCAGGCAGGTGTATCCGGCGAACAG 5440
 D M R Q L W Q H C A A T I A G L L Q Q A G V S G E Q
 ATTAAGGCGTGCGCATCTCCGCTCAGGGTCAAGGGCTCTTCTCCTCGATAAGCAGGATCGGCCGCTGGGTAACGCCAT 5520
 I K G V G I S A Q G Q G L F L L D K Q D R P L G N A I
 CCTCTCCTCCGATCGTCGGGCGCTGAAAATCGTTTACGCGCTGGCAGCGGGACCGTATTCCCGAACGGCTCTATCCCGTTA 5600
 L S S D R R A L K I V Q R W Q R D R I P E R L Y P V T
 CCGCCAGACGCTGTGGACCGGACATCCGGCTTCTTTGCTGCGCTGGGTAAAAGAGAATGAACCCAGCGCTACGCGCAA 5680
 R Q T L W T G H P A S L L R W V K E N E P Q R Y A Q
 ATTGGCTGCGTGATGATGGGGCATGACTATCTGCGCTGGTGCTTAACCGGCGGAAGGGCTGCGAGGAGAGCAACATCTC 5760
 I G C V M M G H D Y L R W C L T G A K G C E E S N I S
 CGAGTCCAACCTCTACAACATGGCCATGGGCCAGTACGACCCGCGCCTGACCGAGTGGCTGGGCATCGGTGAAATCGATA 5840
 E S N L Y N M A M G Q Y D P R L T E W L G I G E I D S
 GCGCGCTGCCCCCGTTGTAGGGTCAGCCGAAATTTGCGGGGAGATCACCGCTCAGGCAGCCGCTTTAACCGGTCTGGCG 5920
 A L P P V V G S A E I C G E I T A Q A A A L T G L A
 GCGGGTACTCCCGTCGTTGGCGGCTGTTTGACGTGGTCTCCACCGCCCTTTGCGCCGGGATTGAGGATGAGTCGACCCT 6000
 A G T P V V G G L F D V V S T A L C A G I E D E S T L
 CAATGCGGTGATGGGGACCTGGGCCGTCACTAGCGGTATCGCTCACGGCCTGCGCGACCATGAGGCCACCCCTTACGTCT 6080
 N A V M G T W A V T S G I A H G L R D H E A H P Y V Y
 ATGGCCGCTACGTCAATGACGGCCAGTATATCGTTTACGAAGCCAGCCGACCTCATCCGGCAACCTcGAATGGTTTACC 6160
 G R Y V N D G Q Y I V H E A S P T S S G N L E W F T
 GCCCAGTGGGGCGATCTCTCGTTTGATGAGATCAATCAGGCCGTGCGCAGCCTGCCGAAAGCCGGGAGCGAGCTGTTTTT 6240
 A Q W G D L S F D E I N Q A V A S L P K A G S E L F F
 TCTGCCGTTTCTGTATGGCAGCAACGCCGGCTGGAGATGACCTGCGGCTTTTACGGCATGCAGGCGCTGCATACCCGCG 6320
 L P F L Y G S N A G L E M T C G F Y G M Q A L H T R A
 CGCACCTGCTGCAGGCGGTTTATGAAGGCGTGGTATTTAGCCATATGACCCACCTCAGCCGTATGCGCGAACGCTTTACA 6400
 H L L Q A V Y E G V V F S H M T H L S R M R E R F T
 AACGTTTCAAGCCCTGCGCGTCACcGGCGGCCCGGCGCACTCCGACGCTCTGGATGCAGATGCTGGCGGACGTAAGCGGCTT 6480
 N V Q A L R V T G G P A H S D V W M Q M L A D V S G L
 ACGCATTGAACCTCCCGAAGGTGGAAGAGACcGGCTGTTTTGGCGCGGCCCTCGCCGCTCGtGTcGGtACcGGCGTATACC 6560
 R I E L P K V E E T G C F G A A L A A R V G T G V Y R
 GCAGcTTTAGCGAAGCCCGGCGCGCCCGGCGAGCACCCGGTGCGCACGcTGCTGCCCGATATGACCGCCACGCGCGCTAT 6640
 S F S E A R R A R Q H P V R T L L P D M T A H A R Y

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Figure 2E

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cAGCGCAAATACCGCCACtACcTGCATTtTGATTGAAGCACTACAGGGCTATCACGCCCGTATTAAGGAGCACGCATTATG 6720
Q R K Y R H Y L H L I E A L Q G Y H A R I K E H A L *
M

AGCCGACCATTACTGCAGCTGGCGcTCGACCATAACCAGCCTTCAGGCTGCGCAGCGCGATGTGCCCTGCTACAGGATCA 6800
S R P L L Q L A L D H T S L Q A A Q R D V A L L Q D H

CGTTGATATTGTGGAGGCGGGAACCATCCTCTGCTTAACCGAAGGGCTTAGCGCGGTTAAAGCCCTGCGCGCCCAgTGTc 6880
V D I V E A G T I L C L T E G L S A V K A L R A Q C P

CGGGGAAGATCATCGTCGCCGACTGGAAAGTCGCCGACGCCGGTGAACCCCTGGCGCAGCAGGCCTTTGGCGCTGGCGCC 6960
G K I I V A D W K V A D A G E T L A Q Q A F G A G A

AACTGGATGACCATCATTTGCGCCGACCGCTCGCCACGGTCGAGAAAGGCCACGCCGTGGCCCAGGCCTGCGGCGGTGA 7040
N W M T I I C A A P L A T V E K G H A V A Q A C G G E

AATTCAGATGGAGCTGTTCGGCAACTGGACGCTGGATGACGCCCCGCGCTGGTACCGTACCGGCGTCCATCAGGCGATT 7120
I Q M E L F G N W T L D D A R A W Y R T G V H Q A I Y

ACCATCGCGGACGCGATGCCAGGCCAGCGGGCAGCAGTGGGGGGAGGCGGATCTGGCGCGCATGAAAGCGCTGTCCGAT 7200
H R G R D A Q A S G Q Q W G E A D L A R M K A L S D

ATTGGCCTTGAGCTATCGATTACCGGCGGCATTACCCCAGCCGATCTACCGCTGTTCAAAGATATCAACGTCAAAGCCTT 7280
I G L E L S I T G G I T P A D L P L F K D I N V K A F

TATTGCCGGGCGCGCTGGCAGGCGCGCCCATCCGGCGGGGTTGCCGCCGAATTCCACGCGCAAATCGACGCTATCT 7360
I A G R A L A G A A H P A R V A A E F H A Q I D A I W

→ *yiaR*

GGGGAGAACAGCATGCGTAACCAACCCGTTAGGTATTTATGAAAAAGCGCTGGCGAAGGATCTCAGCTGGCCTGAGCGGCT 7440
G E Q H A *
M R N H P L G I Y E R A L A K D L S W P E R L

GGTACTGGCCAAAGCTGCGGTTTTGATTTTGTGCGAAATGTGCGGTGGACGAGACCGATGAACGCCTTTTCGCGCCTGGAGT 7520
V L A K S C G F D F V E M S V D E T D E R L S R L E W

GGACCCCGGCCAGCGCGCATCGCTGGTGAGCGCGATGCTGGAAACCGCGGTGCCATTCCCTCGATGTGCTTGTCCGCC 7600
T P A Q R A S L V S A M L E T A V A I P S M C L S A

CATCGCCGTTTCCCCTTTGGCAGCCGCGATGAAGCGGTACGCGATCGGGCGGAGAGATTATGACCAAAGCCATcCGCCT 7680
H R R F P F G S R D E A V R D R A R E I M T K A I R L

GGCGCGGATCTGGGGATCCGCACCATCCAGCTGGCGGGTTACGACGTCTATTACGAAGAGCATGATGAAGGCACCCGGC 7760
A R D L G I R T I Q L A G Y D V Y Y E E H D E G T R Q

AGCGTTTTTGCCGAAGGGCTGGCCTGGGCGGTAGAACAGGCCCGCCGCGCAGGTAATGCTGGCGGTGGAGATCATGGAC 7840
R F A E G L A W A V E Q A A A A Q V M L A V E I M D

ACCGCCTTTATGAACCTCATCAGCAAATGGAAAAAGTGGGACGAGATGCTTTCGTCACCGTGGTTTACCGTCTACCCGGA 7920
T A F M N S I S K W K K W D E M L S S P W F T V Y P D

CGTCGGCAACCTCAGCGCCTGGGGAAACGACGTCACCGCCGAGCTGAAGCTGGGCATCGATCGTATCGCCGCCATCCACC 8000
V G N L S A W G N D V T A E L K L G I D R I A A I H L

TGAAAGATACGCTGCCCGTGACCGACGATAGCCCTGGCCAGTTCGCGGACGTGCCGTTCCGgCGAAGGATGCGTcGATTTT 8080
K D T L P V T D D S P G Q F R D V P F G E G C V D F

GTCGGCATTTTAAAGACGcTGGCGgAGCTGAACCTACCGCGGTTcATTTTtTGATTGAGATGTGGACGGAGAAAGCCAGCGA 8160
V G I F K T L R E L N Y R G S F L I E M W T E K A S E

→ *yiaS*

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Figure 2F

GCCGGTGCTGGAGATTATCCAGGCCCGGCGTGGATCGAATCACGGATGCAGGAAGGGGGATTACATGTTAGAACAACCT 8240
 P V L E I I Q A R R W I E S R M Q E G G F T C *
 M L E Q L

GAAAGCCGAGGTACTGGCGGCAACCTGGCCCTCCCCGCACACGGCCTGGTCACCTTTACCTGGGGCAACGTCAGCGCGG 8320
 K A E V L A A N L A L P A H G L V T F T W G N V S A V

TCGATGAAACGCGCAAGCTGATGGTCATTAAAGCCTTCCGGCGTCAATATGAGGTGATGACCGCCGACGATATGGTGGTC 8400
 D E T R K L M V I K P S G V E Y E V M T A D D M V V

GTAGAGATGGCCAGCGGTAAAGTCGTTGAAGGCGGTAAAAACCTCTTCAGATACGCCAACGCATCTGGCGCTTTATCG 8480
 V E M A S G K V V E G G K K P S S D T P T H L A L Y R

CCGCTATCCGCAGATCGGCGGGATCGTGCATACCCACTCCCGCCACGCGACGATCTGGTCGCAGGCCGGGCTCGATCTCC 8560
 R Y P Q I G G I V H T H S R H A T I W S Q A G L D L P

CCGCCTGGGGCACCACCCACGCCGACTACTTCTATGGCGCGATCCCTGTACCCGACGGATGACCGTTGAGGAGATTAAC 8640
 A W G T T H A D Y F Y G A I P C T R R M T V E E I N

GGCGAGTATGAGTATCAGACCGCGGAGGTGATTATCAAAACCTTTGAACAGCGCGGCCTGGATCCGGCGCAAATCCCGGC 8720
 G E Y E Y Q T G E V I I K T F E Q R G L D P A Q I P A

GGTATTGGTCCATTACACGGCCCCCTTTGCCTGGGGTAAAGACGCCGCCGACGCCGTACATAACGCCGTGGTGCTGGAGG 8800
 V L V H S H G P F A W G K D A A D A V H N A V V L E E

AGTGCGCCTACATGGGCCTCTTCTCGCGCCAGTGGCCACAGCTGCCGGATATGCAGTCTGAACTGCTCGATAAACTAT 8880
 C A Y M G L F S R Q W P Q L P D M Q S E L L D K H Y L

CTGCGTAAACACGGCGCGAAGCTATTACGGGCAAACTAGTCCCGCGGAACTCCCGGATAAGGCGCTTTGGCCCCCGG 8960
 R K H G A N A I T G K T S P A E L P G

GGGAAGCGTGCAGGATGTTGCTGAACTTTCCCGGAGCGATGCTGCGCATCTGTCCGGGCTACGCGTCCCGGCGCTCTGC 9040

GGTCAGCACCGCGCCCCGGCGGAAAACCCATCAACCCTACGCCGAATTAATATGTCCTTGCACTAACGACGCTTCCACGCC 9120
 GCCGGTCCAGGCTGGTGTGCTTGCAGAAAATCTTGCAGAAAATAGCCGACATCGTTAAACCCGCATTTTCATCGCCACCTCG 9200
 GTAATCGACAGGGAATCGCTGATAAGCAGCTTTTCCGCCGCCCTTACCCGCTGACGGTGCAGCGCTTCGGTAACGTCAGC 9280
 CGGAAAGCATGGCGATAAACGGCCCCAGATAACCCGCGTTGCAGTGCAGCTCCT

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Figure 3

ViaJ-Ko	MGT-----KE	SENTQDKERP	AGSQSLFRGL	MLIEILSNYP	NGCPVAHLSE
ViaJ-Ec	MGKEVMGKKE	NEMAQEKERP	AGSQSLFRGL	MLIEILSNYP	NGCPLAHLSE
ViaJ-Hi	MNIEVK----	----MEKEKS	LGNQALIRGL	RLLDILSNYP	NGCPLAKLAE
ViaJ-Ko	LAGLNKSTVH	RLQGLQSCG	YVTPAPAAGS	YALTKFIRV	GQKALSSLNI
ViaJ-Ec	LAGLNKSTVH	RLQGLQSCG	YVTPAPAAGS	YRLTKFIAV	GQKALSSLNI
ViaJ-Hi	LANLNKSTAH	RLQGLQNEG	YVKPANAAGS	YRLTIKCLSI	GQKVLSSMNI
ViaJ-Ko	IHVAAPHLEA	LNLATGETVN	FSSREDDHAI	LTYKLEPTTG	MLRTRAYIGQ
ViaJ-Ec	IHIAAPHLEA	LNIAATGETIN	FSSREDDHAI	LTYKLEPTTG	MLRTRAYIGQ
ViaJ-Hi	IHVASPYLEQ	LNCLKGETIN	FSKREDDHAI	MTYKLEPTNG	MLKTRAYIGQ
ViaJ-Ko	HMR--CTARQ	WAKIYMAFGH	P-DYVESIWN	SHQEIQPLT	RNTITGLPAM
ViaJ-Ec	HMPLYCSAM-	-GKIYMAFGH	P-DYVKSWE	SHQEQIPLT	RNTITGLPAM
ViaJ-Hi	YLKLYCSAM-	-GKIFLAYEK	KVDYLSHYWQ	SHQREIKKLT	RYTITLDDI
ViaJ-Ko	HDELAQIRER	NMAMDREENE	LGVSCLAVPV	FDIHGRVPYA	ISISLSTSL
ViaJ-Ec	FDELAHIRE	GAAMDREENE	LGVSCLAVPV	FDIHGRVPYA	VSISLSTSL
ViaJ-Hi	KLELETIRQT	AYAMDREENE	LGVTCLACP	FDSFGQVEYA	ISVSMSIYRL
ViaJ-Ko	KQVGEKNLLK	PLRDTAEAIS	RELGFVSREG	-----	
ViaJ-Ec	KQVGEKNLLK	PLRETAQAIS	NELGFTVRDD	LGAIT	
ViaJ-Hi	NKFGTDAFLQ	EIRKTAEQIS	LELGYEN---	-----I	

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Figure 4

yiaK-Ko	MKVTFEQ LKE	AFNRVLLDAC	VARETADACA	EMFARTTESG	VYSHGVNRFP
yiaK-Ec	MKVTFEQ LKA	AFNRV LISR	VDSE TADACA	EMFARTTESG	VYSHGVNRFP
yiaK-Hi	MRVSYDE LKN	EFKRVLLDRQ	LTEELAECA	TAFTDTQAG	AYSHGINRFP
yiaK-Ko	RFIQQLDNGD	IIPFAQPQRV	TTLGA IEQWD	AQRS IGNLTA	KKMMDRA IEL
yiaK-Ec	RFIQQLENG D	IIPDAQPKR I	TS LGA IEQWD	AQRS IGNLTA	KKMMDRA IEL
yiaK-Hi	RFIQQLFQGD	IVPNA IP TKV	LS LGS IEQWD	AHQA IGNLTA	KKMMDRA IEL
yiaK-Ko	ASDHG IGLVA	LRNANHWMRG	GSYGWQAAEK	GY IG ICWTNS	IAVMAPWGAK
yiaK-Ec	AADHG IGLVA	LRNANHWMRG	GSYGWQAAEK	GY IG ICWTNS	IAVMPPWGAK
yiaK-Hi	ASQHG VGV IA	LRNANHWMRG	GSYGWQAAEK	GY IG ICWTNA	LAVMPPWGAK
yiaK-Ko	ECR IG TNPLI	VA IPS TP ITM	VDM SMSMFSY	GM LEVNRLAG	RE LPVDGGFD
yiaK-Ec	ECR IG TNPLI	VA IPS TP ITM	VDM SMSMFSY	GM LEVNRLAG	RQ LPVDGGFD
yiaK-Hi	ECR IG TNPLI	IAVPTTP ITM	VDM SC SMYSY	GM LEVHRLAG	RQTFVDAGFD
yiaK-Ko	DDGRLTKEPG	T IEKNRR ILP	MGYWKGSGLS	IV LDM IATLL	SNGSSVAEVT
yiaK-Ec	DEGNLTKEPG	V IEKNRR ILP	MGYWKGSGLS	IV LDM IATLL	SDGASVAEVT
yiaK-Hi	DEGNLT RDPS	IVEKNRR LLP	MGFWKGSGLS	IV LDM IATLL	SNGESTVAVT
yiaK-Ko	QENSDEYGV S	Q IF IA IEVDK	L IDGATRD AK	LQR IMDF ITT	AERADENVAV
yiaK-Ec	QDNSDEY G IS	Q IF IA IEVDK	L IDGP TRDAK	LQR IMDYVTS	AERADENQA I
yiaK-Hi	EDKNDEYCVS	QVF IA IEVDR	L IDGKSKDEK	LNR IMDYVKT	AERSDP TQAV
yiaK-Ko	RLPGHEFTRL	LDENRRNG IT	VDDSVWAK IQ	AL	
yiaK-Ec	RLPGHEFTTL	LAENRRNG IT	VDDSVWAK IQ	AL	
yiaK-Hi	RLPGHEFTTI	LSDNQ TNG IP	VDERVWAKLK	TL	

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Figure 5

yiaL-Ko	MIFGH IAQPN	-PCRLPAA IE	RALDFLR TTD	FHALAPGVVE	IDGQN IFAQV
yiaL-Ec	MIFGH IAQPN	-PCRLPAA IE	KALDFLRATD	FNALEPGVVE	IDGKN IY TQ I
yhch-Hi	MIISSLTNPN	FKVGLPKV IA	EVCDY LNTLD	LNALENGRHD	INDQ -IYMNV

yiaL-Ko	IDL TTRDAAE	NRPEVHRRYL	D IQFLASGEE	K IG IA ID TGN	NQ ISES LLEQ
yiaL-Ec	IDL TREAVV	NRPEVHRRY I	D IQFLAWGEE	K IG IA ID TGN	NKVSES LLEQ
yhch-Hi	MEPE TAE PSS	KKAE LHHEY L	DVQV LIRGTE	N IEVGATYPN	LSKYEDYNEA

yiaL-Ko	RD IIFYHDSE	HESFFEMTPG	NYA IFFPQDV	HRPGCNKTVA	TP -IRK IVVK
yiaL-Ec	RN IIFYHDSE	HESF IEM IPG	SYA IFFPQDV	HRPGC IMQ TA	SE -IRK IVVK
yhch-Hi	DDYQLCAD ID	DKFTV TMKPK	MFAV FYPYEP	HKPCCV VNGK	TEK IKKLVVK

yiaL-Ko	VA ISV L -
yiaL-Ec	VALTALN
yhch-Hi	VPVK -L I

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Figure 6

IyHK-Ko	MSKKQAFWLG	IDCGGTYLKA	GLYDAEGHEH	GIVRQALRTM	SPLPGYAERD
IyHK-Ec	MTQ ---YWLG	LDCGGSWLKA	GLYDREGREA	GVQRLPLCAL	SPQPGWAERD
IyHK-Hi	MH ---YYLG	IDCGGTFIKA	AIFDQNGTLQ	S IARRN IP II	SEKPGYAERD

IyHK-Ko	MRQLWQHCAA	TIAGLLQQAG	VSGEQIKGVG	ISAQGQGLFL	LDKQDRPLGN
IyHK-Ec	MAELWQCCMA	VIRALLTHSG	VSGEQIVGIG	ISAQKGGLFL	LDKNDKPLGN
IyHK-Hi	MDELWNLCQA	VIQKTIRQSS	ILPQQIKAIG	ISAQKGGAFF	LDKDNKPLGR

IyHK-Ko	A ILSSDRRAL	KIVQRWORDR	IPERLYPVTR	QTLWTGHPAS	LLRWVKENEP
IyHK-Ec	A ILSSDRRAM	EIVRRWOEDG	IPERLYPLTR	QTLWTGHPVS	LLRWLKEHEP
IyHK-Hi	A ILSSDORAY	EIVQCWQKEN	ILQKFYPTL	QTLWMGHPVS	ILRWIKENEP

IyHK-Ko	QRYAQIGCVM	MGH DYLRWCL	TGAKGCEESN	ISESNLYNMA	MGQYDPRLTE
IyHK-Ec	ERYAQIGCVM	MTHDYLRWCL	TGVKGCEESN	ISESNLYNMS	LGEYDPC LTD
IyHK-Hi	SRYEQIHTIL	MSHDYLRFCI	TEKLYCEETN	ISESNFYNNR	EGKYDIQ LAK

IyHK-Ko	WLG IGE IDSA	LPPVVGSAEI	CGE ITAQAAA	LTGLAAGTPV	VGGLFDV VST
IyHK-Ec	WLG IAE INHA	LPPVVGSAEI	CGE ITAQ TAA	LTGLKAGTPV	VGGLFDV VST
IyHK-Hi	LFG ITEC IDK	LPP I IKSNI	AGYVTSRAAE	QSGLVEGIPV	VGGLFDV VST

IyHK-Ko	ALCAG IEDES	TLNAVMG TWA	VTSG IAHGLR	DHEAHPYVYG	RYVNDGQY IV
IyHK-Ec	ALCAG IEDEF	TLNAVMG TWA	VTSG ITRGLR	DGEAHPYVYG	RYVNDGEF IV
IyHK-Hi	ALCAD LKDDQ	HLNVVLGTWS	VVSGV THY ID	DNQT IPFVYG	KYPEKNKFII

IyHK-Ko	HEASPTSSGN	LEWFTAQWGD	LSFDE INQAV	ASLPKAGSEL	FFLPFLYGSN
IyHK-Ec	HEASPTSSGN	LEWFTAQWGE	ISFDE INQAV	ASLPKAGGDL	FFLPFLYGSN
IyHK-Hi	HEASPTSAGN	LEWFVNQFNL	PNYDD INHE I	AKLKPASSSV	LFAPFLYGSN

IyHK-Ko	AGLEMT CGFY	GMQALH TRAH	LLQAVYEGVV	FSHMT HLSRM	RERFTNVQAL
IyHK-Ec	AGLEMTSGFY	GMQA IH TRAH	LLQA IYEGVV	FSHMT H LNM	RERFTDVHTL
IyHK-Hi	AKLG MQAGFY	G IQSHHTO IH	LLQA IYEGV I	FS LMSH LERM	QVRFPNASTV

IyHK-Ko	RV TGGPAHSD	VWMQMLADVS	GLR IELPKVE	ETGCFGAALA	ARVGTGVYRS
IyHK-Ec	RV TGGPAHSD	VWMQMLADVS	GLR IELPQVE	ETGCFGAALA	ARVGTGVYHN
IyHK-Hi	RV TGGPAKSE	VWMQMLAD IS	GMRLE IPN IE	ETGCLGAALM	AMQAESA ---

IyHK-Ko	FSEARRARQH	PVRTLLPDMT	AHARYQRKYR	HYLHL IEALQ	GYHAR IKEHA
IyHK-Ec	FSEAQRDLRH	PVRTLLPDMT	AHQLYQKKYQ	RYQHL IAA LQ	GFHAR IKEHT
IyHK-Hi	-VE ISQ ILN I	DRK IFLPDKN	QYSKYQBKYY	RYLKF IEALK	NLD -----

IyHK-Ko	L
IyHK-Ec	L
IyHK-Hi	-

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Figure 7

yiaQ-Ko	MSRPLLOLAL	DH TSLQAAQR	DVALLQDHVD	IVEAGTILCL	TEGLSAVKAL
yiaQ-Ec	MSRPLLOLAL	DHSSLEAAQR	DVTLLKDSVD	IVEAGTILCL	NEGLGAVKAL
yiaQ-Hi	MGKPLLOIAL	DAQYLETALV	DVKQIEHNID	TIEVGTILAC	SEGMRAVRIL

yiaQ-Ko	RAQCPGKIIV	ADWKVADAGE	TLAQQAFGAG	ANWMTIICAA	PLATVEKGHA
yiaQ-Ec	REQCPDKIIV	ADWKVADAGE	TLAQQAFGAG	ANWMTIICAA	PLATVEKGHA
yiaQ-Hi	RALYPNQILV	CDLKT TDAGA	TLAKMAFEAG	ADWLTVSAAA	HPATKAACQK

yiaQ-Ko	VAQA-----	---CGGEIQM	ELFGNWTLDD	ARAWYRTGVH	QA IYHRGRDA
yiaQ-Ec	MAQR-----	---CGGEIQI	ELFGNWTLDD	ARDWHRIGVR	QA IYHRGRDA
yiaQ-Hi	VAEEFNKIQP	NLGVPKIQI	ELYGNNWFDE	VKNWLQLGIK	QA IYHRSRDA

yiaQ-Ko	QASGQQWGEA	DLARMKALSD	IGLELSITGG	ITPADLPLFK	DIN-VKAFIA
yiaQ-Ec	QASGQQWGEA	DLARMKALSD	IGLELSITGG	ITPADLPLFK	DIR-VKAFIA
yiaQ-Hi	ELSGLSWSNQ	D IEN IEK LDS	LG IELSITGG	ITPDDLHLFK	NTKNLKAFIA

yiaQ-Ko	GRALAGAAHP	ARVAAEFHAQ	IDA IWGEQHA
yiaQ-Ec	GRALAGAANP	AQVAGDFHAQ	IDA IWGGARA
yiaQ-Hi	GRALVGKSGR	-E IAEQLKQK	IGQFW----I

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Figure 8

yiaR-Ko	MR -----	---NHPLG IY	EKALAKDLSW	PERLV LAKSC	GFD FVEMSVD
yiaR-Ec	MRKSTLSGEV	RVRNHQLG IY	EKALAKDLSW	PERLV LAKSC	GFD FVEMSVD
yiaR-Hi	MKK -----	---HK IG IY	EKALPKN ITW	QERLS LAKAC	GFE F IEMS ID

yiaR-Ko	ETDERLSRLE	WTPAQRASLV	SAMLETAVAI	PSMCLSAHRR	FPFGSRDEAV
yiaR-Ec	ETDERLSRLD	WSAAQRTSLV	AAM IETGVGI	PSMCLSAHRR	FPFGSRDEAV
yiaR-Hi	ESNDRLSRLE	WTKSERIALH	QSIIQSGITI	PSMCLSAHRR	FPFGSKDKKI

yiaR-Ko	RDRAREIMTK	AIRLARDLGI	RTIQLAGYDV	YYEEHDEGTR	QRFAGELAWA
yiaR-Ec	RERAREIMSK	AIRLARDLGI	RTIQLAGYDV	YYEDHDEGTR	QRFAGELAWA
yiaR-Hi	RQKSFEIMEK	AIDLSVNLGI	RTIQLAGYDV	YYEKQDEETI	KYFOEGIEFA

yiaR-Ko	VEQAAAAQVM	LAVEIMDTAF	MNSISKWKKW	DEMLSSPWFT	VYPDVGNLSA
yiaR-Ec	VEQAAASQVM	LAVEIMDTAF	MNSISKWKKW	DEMLASPWFT	VYPDVGNLSA
yiaR-Hi	VTLAASAQVT	LAVEIMDTPF	MSSISRWKKW	DTIINSPWFT	VYPDIGNLSA

yiaR-Ko	WGNDVTAE LK	LGIDR IAA IH	LKDTLPVTDD	SPGQFRDVPF	GEGCVDFVGI
yiaR-Ec	WGNDVPAELK	LGIDR IAA IH	LKDTQPV TGQ	SPGQFRDVPF	GEGCVDFVGI
yiaR-Hi	WNNNIEEELT	LGIDK ISA IH	LKDTYPVTET	SKGQFRDVPF	GQGCVDVVFH

yiaR-Ko	FKTLRELNYR	GSFLIEMWTE	KASEPVLEII	QARRW IESRM	QEGGFTC
yiaR-Ec	FKTLHKLNRY	GSFLIEMWTE	KAKEPVLEII	QARRW IEARM	QEAGFIC
yiaR-Hi	FSLLKKLNRY	GAFLIEMWTE	KNEEPLLEII	QARKW IVQQM	EKAGLLC

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Figure 9

yiaS-Ko	MLEQLKAEVL	AANLALPAHG	LVTFWTGNVS	AVDETRKLMV	IKPSGVEYEV
yiaS-Ec	MLEQLKADVL	AANLALPAHH	LVTFWTGNVS	AVDETRQWMV	IKPSGVEYDV
yiaS-Hi	MLAQLKKEVF	EANLALPKHH	LVTFWTGNVS	AIDREKNLVV	IKPSGVDDYDV

yiaS-Ko	MTADDMVVVE	MASGKVVEGG	KKPSSDTPTH	LALYRRYPQI	GGIVHTHSRH
yiaS-Ec	MTADDMVVVE	IASGKVVEGS	KKPSSDTPTH	LALYRRYAEI	GGIVHTHSRH
yiaS-Hi	MTENDMVVVD	LFTGNIVEGN	KKPSSDTPTH	LELYRQFPHI	GGIVHTHSRH

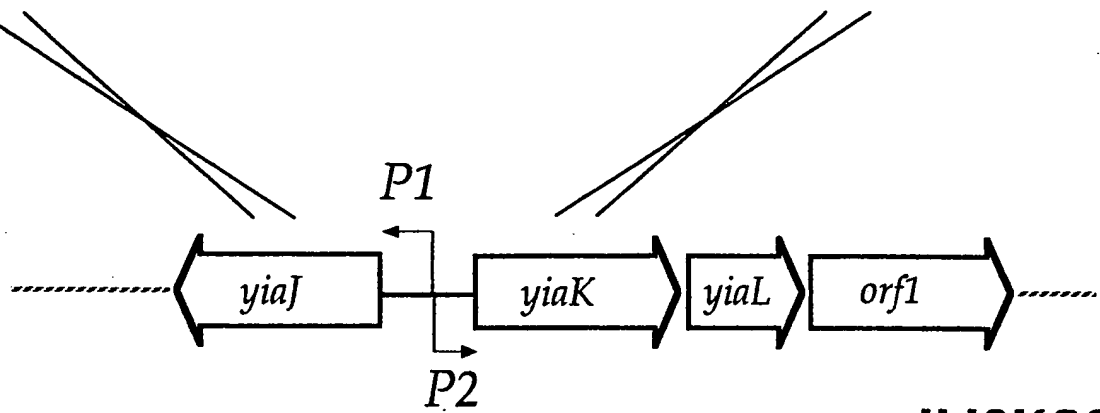
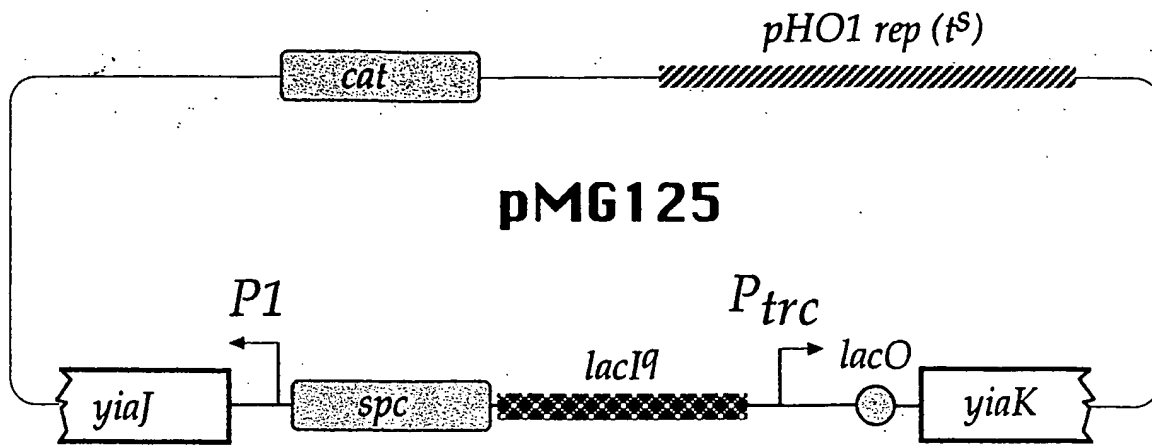
yiaS-Ko	ATIWSQAGLD	LPAWGTTHAD	YFYGAIPC TR	RMTVEE INGE	YEYQTGEV II
yiaS-Ec	ATIWSQAGLD	LPAWGTTHAD	YFYGAIPC TR	QMTAEE INGE	YEYQTGEV II
yiaS-Hi	ATIWAQAGLD	IEVGTTHGD	YFYGTIPC TR	QMTTKE IKGN	YELETGKV IV

yiaS-Ko	KTFEQRGLDP	AQIPAVLVHS	HGPFAWGKDA	ADAVHNAVVL	EECAYMGLFS
yiaS-Ec	ETFEERGRSP	AQIPAVLVHS	HGPFAWGKNA	ADAVHNAVVL	EECAYMGLFS
yiaS-Hi	ETFLSRGIEP	DNIPAVLVHS	HGPFAWGKDA	NNAVHNAVVL	EEVAYMNLFS

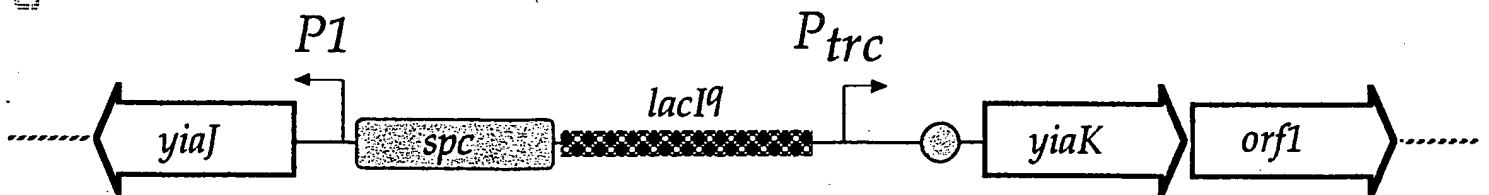
yiaS-Ko	RQW-PQLPDM	QSELLDKHYL	RKHGANA ITG	KTSPAELPG
yiaS-Ec	RQLAPQLPAM	QNELLDKHYL	RKHGANAYYG	Q-----
yiaS-Hi	QQLNPYLSPM	QKDLLDKHYL	RKHGONAYYG	Q-----

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Figure 10



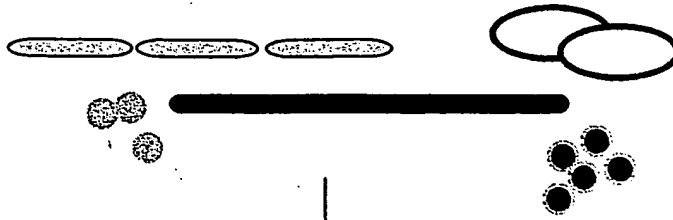
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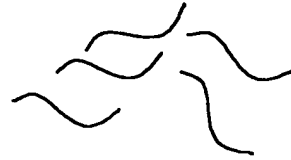
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Figure 11

Microbial World

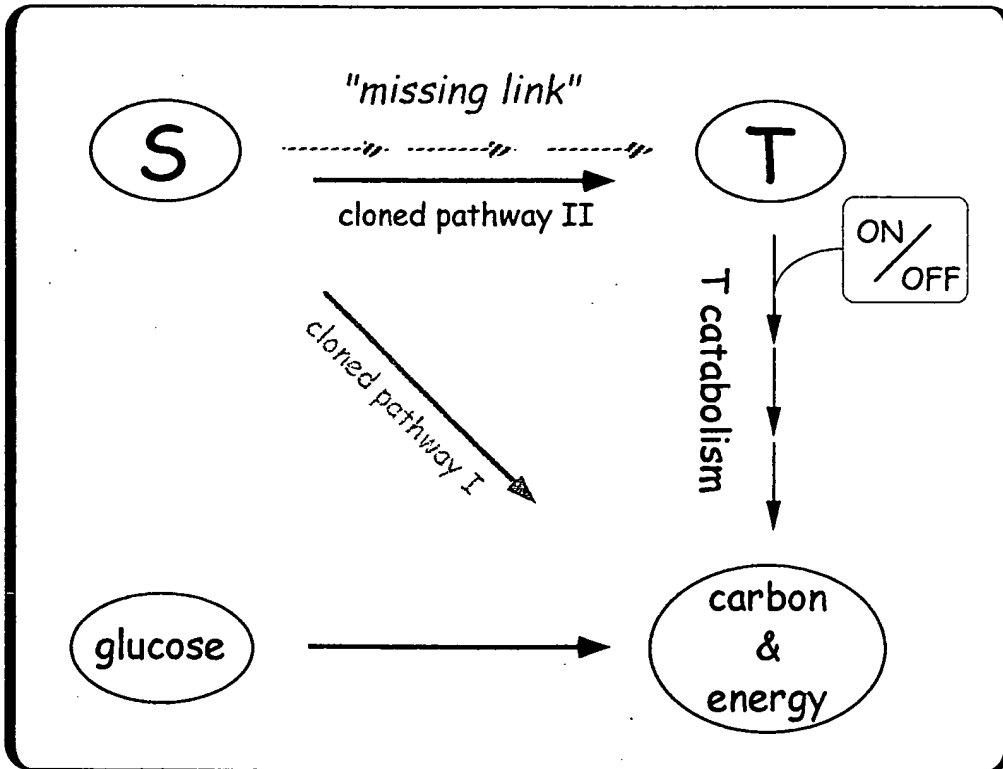


Genetic Material

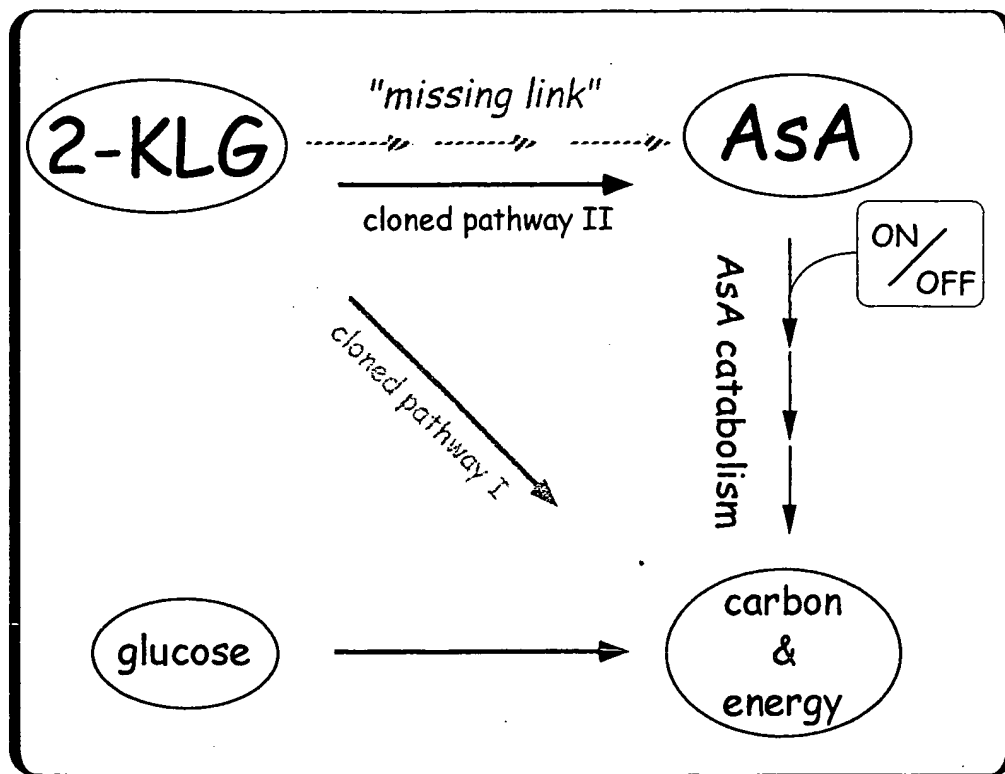
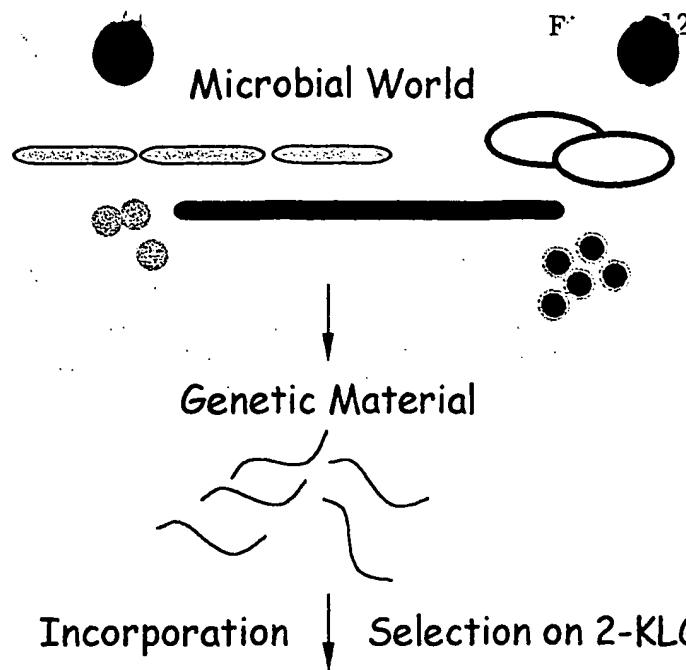


Incorporation

Selection on S



Tester Strain

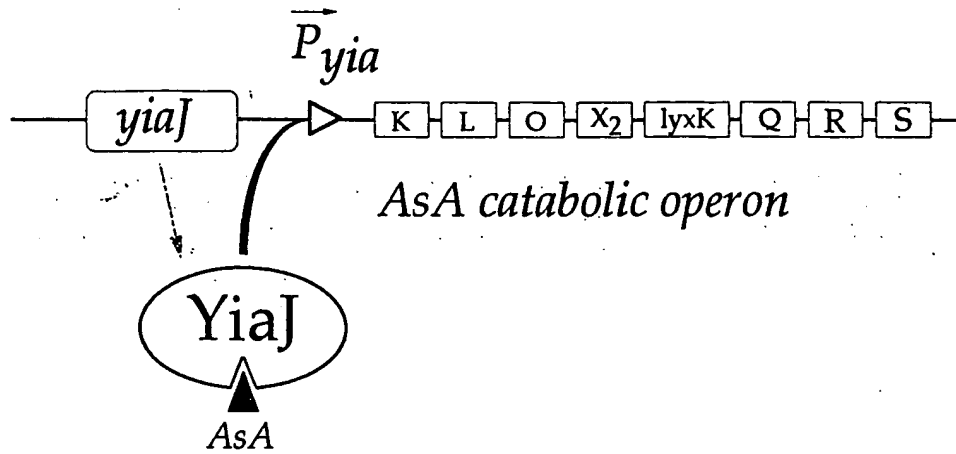


Tester Strain

The Metabolic Selection Strategy

Figure 13

A



B

